

considered in planning for these areas. The geographical and climatological diversity in North Carolina calls for careful consideration of ECMs that may have a short payback in one region but a longer payback in another region .

## **Fresh-Air Ventilation**

Fresh air may be introduced into the occupied space by ducting the fresh air and introducing it into the return air of the air handling unit or it may be delivered directly into the space by a separate ducted system and air-handling unit.

Fresh air introduced into the return air system may be untreated or may be required to be dehumidified in more humid climates. Fresh air systems that deliver the fresh air directly to the classrooms should always be cooled and heated.

Either system may be able to use exhaust air to temper the fresh air (and save energy) with an air-to-air heat exchanger.

## **Ventilation Rates**

Adequate fresh air must be provided to avoid indoor air quality problems. Over-ventilation will always result in high humidity problems unless costly steps are taken to control the humidity level. Good filtration (60%) can remove much of the airborne contaminants and reduce the need for dilution effects of high ventilation rates. High ventilation rates result in both higher first costs and higher operating costs.

## **Dehumidification Technology**

### ***General***

Control of indoor relative humidity (RH) is a challenging design problem. It is established that the lack of proper humidity control can lead to increased indoor air quality complaints. ASHRAE Standard 55-92 states that space humidities should not exceed 60% RH at any temperature. There are numerous strategies for controlling relative humidity while admitting more ventilation air.

### ***Conventional Systems***

Conventional AC systems primarily control the temperature and not the humidity level. As a first step, effective humidity removal using packaged and unitary equipment or fan coils critically depends on not over-sizing the equipment for the load. Energy Management Systems (EMS) allow explicit monitoring and control of space relative humidity. These should be considered, particularly where interior moisture levels are likely to be of concern. However, it should be recognized that EMS controls alone cannot mitigate humidity concerns, since humidistat control without means of reheat may over cool the conditioned space. Even so, there are several operationally related suggestions that can help to reduce moisture levels with conventional systems.

- C Reducing supply air flow will decrease air coil velocity and result in increased moisture removal from the air. However, reducing the air flow to DX coils should only be done with electronic and pressure/temperature regulated coils.